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# Colour in Online Advertising: Going for Trust, Which Blue is a Must?

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**ABSTRACT** In an online environment the customer relies heavily on cues that indicate that an electronic vendor (e-vendor), can be trusted (especially in comparison with an offline shopping environment). Several studies investigated the factors that reduce mistrust in an online environment. However, little is known about the effects of colour on the process of establishing trust between e-vendor and consumer, and purchase intention. The current body of studies on the effects of, specifically, the colour blue on trust in an online environment also show contrasting results. Further, the literature review revealed that (value) variations of colours have different effects on human behaviour, or perception. It was also argued that the effect of blue on trust and behaviour would be greater for people from cultures that are generally more risk averse. The aim of the present study, therefore, was to investigate the effect of two different values of blue (i.e. lighter and darker valued) on trust and the intention to book an accommodation, differentiated by culture. In an online experiment 91 Chinese and 125 Dutch respondents (average age 27 years) were presented with an accommodation offer displayed within either a predominantly darker, or lighter valued blue environment. The results showed an indirect (mediating) effect of trust on the relationship between the predominantly darker coloured blue environment and booking intention. There was no evidence for the hypothesized moderating effect of culture. To conclude, this study contributes to a better understanding of the effects of (value) variations of colour in an online environment on human behaviour, and perception. The use of dark blue colour schemes in an online environment can be recommended to e-vendors. Especially in online environments in which the customer is more involved (e.g. financially) or vulnerable in the (purchasing) process, and thus more cues are needed to win a visitor's trust.

## KEYWORDS:

Online consumer behaviour; Persuasion marketing; Trust; Colour; Cross-cultural

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## 1. Introduction

Trust plays a crucial role in online shopping. Similar to walking into a new store, visitors of an online environment also rely on the created visual impression. Cyr (2008) found that website features such as information, navigation, and visual design positively influence trust as well. A few studies have also investigated the effects of a relatively important component that determines a website's visual impression, namely colour: Kim and Moon (1998); Lee and Rao (2010); Cyr, Head and Larios (2010). These studies confirmed the positive effect of cool colours, such as blue, on trust in an online environment. However, the findings from Broeder and Scherp (2017) did not show a similar positive effect of blue on trust in an online environment. Furthermore, the contrasts in effects on human perception and associations between lighter (Gorn, Chattopadhyay and Dahl, 1997; Russo and Boor, 1993) and darker (Cimbalo, Beck and Sendziak, 1978) colours raises interest in investigating the effects of value variations (i.e. lighter of darker variations) of blue on trust in an online environment.

The ongoing process of a globalizing economy can cause for traditions and beliefs to be transferred from one society to another. Nonetheless, studies by Chau et al. (2002), and Lim et al.

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(2004) showed that there are still differences in online consuming behaviour of individuals from different cultures. This emphasizes that although consumers may now shop more globally, they still act locally. Hence, a study investigating the cross-cultural effects of factors that may influence online consuming behaviour can still be relevant.

It is suggested that in an online environment, people from cultures that are more risk averse (i.e., more uncertainty avoidant), might attach more value to trust-inducing cues. Recently, Broeder and Scherp (2017), compared Western and Asian consumers and, could not find evidence for a trust effect on buying a photo camera in a blue online environment, compared to red and yellow environments. Therefore, it is wondered whether cultural differences regarding uncertainty avoidance influences the effect of different valued blue environments on human behaviour, and perception in an online environment. Hence, the research question of this study is as follows: What is the role of trust in the effect of different valued blue (i.e. lighter or darker) online environments on online behavioural intention, differentiated by culture related uncertainty avoidance.

## 2. Theoretical background

### 2.1. Differentiations of blue

The colour blue has been revealed to be associated with trust in various online settings (i.e. when shopping for different types of products, or online services). For websites, Bonnardel, Piolat and Le Bigot (2011) exposed participants to websites with predominant colours (i.e. red, blue, purple, orange, green, and grey). The results showed that the blue, orange and grey environments received the highest preference scores. For online stores, Lee and Rao (2010) confirmed that online stores with blue colour schemes are more trusted than overall green stores. Likewise, Cyr, Head and Larios (2010) also confirmed the effects blue on trust in an online environment (compared to yellow). Additionally, Broeder and Scherp (2017) investigated their premise on the effects of blue on purchase intention mediated by trust in an e-commerce setting. However, their results showed no relation between the colour blue and trust in an online environment. These results are in contrast with the overall positive associations with blue, and the confirmations of the positive influence of blue on trust by the studies discussed earlier. This leads to confusion as to why the premise of Broeder and Scherp (2017) is not supported by their empirical data.

Remarkably, in all of the studies discussed earlier no clear account is provided for the chosen value of blue. This raises the question whether, in any case, the correct colour value of blue has been displayed to positively influence trust in an online environment. For example, Broeder and Scherp (2017) chose to use a one distinctive value of the colour blue with no predominantly added lightness or darkness (RGB colour code = 0000FF). Therefore, it could be that no effect of blue on trust was found because other variations of blue (i.e. lighter or darker) were not tested. In this respect, Gorn et al. (1997) suggested that the use of light value colours (i.e. tints) increases ad likeability and feelings of relaxations. Moreover, studies have shown that white is generally associated with positive feelings (Russo and Boor, 1993) and that black is generally associated with negative feelings (Cimbalo, Beck and Sendziak, 1978). Consequently, this led to the assumption that blue with added shades of black (i.e. dark blue) would evoke more negative feelings and thus a lower sense of trust. Therefore, in establishing trust through specific values of blue, the following hypothesis is formulated:

**Hypothesis 1.** An online environment displaying a lighter value blue yields a higher level of trust than an online environment displaying a darker value blue.

Different colours also have a different persuasive effect on consumers. Hall and Hanna (2004) examined the effects of web page text/background colour combination. Their results indicated that preferred colours led to higher intentions to purchase. Viswanathan and Swaminathan (2017) discovered that high colour impact helps to improve the click-through-rate on landing pages and was found to be one of the key drivers. For an (offline) retail environment, Bellizzi and Hite (1992) found that blue leads to more purchases, less postponement, and stronger urge to shop. Based on these findings, the following hypothesis is formulated:

**Hypothesis 2.** An online environment displaying a lighter value blue yields a higher behavioural intention than an online environment displaying a darker value blue.

## 2.2 Differentiation of trust

Online trust in e-commerce is repeatedly identified as a limitation for people to engage in online transactions because usually the exchange of financial and personal information is involved. Similar to Ang, Dubelaar and Lee (2002), Wang and Emurian (2005) underline the crucial contribution of web design features in inducing trust. McKnight and Chervany (2002) suggest three different types of trust: initial trust, institutional trust, and dispositional trust. These are distinct attributes of the e-commerce consumer. Initial trust refers to the trust in a specific e-vendor, and thus is context dependent. Initial trust is the first stage of trust establishment where there is a lack of first-hand knowledge, credible information and experience with the e-vendor. In the context of an online environment, initial trust involves the initial judgment regarding a website and whether or not it can be trusted to proceed with an online transaction, for example. Secondly, institutional trust refers to the perceived trustworthiness of the web environment, or the Internet, itself. It is the perception of structural elements of the Internet such as safety and security. Lastly, dispositional trust refers to the general tendency to trust others, the willingness to depend on situations, persons or both. These three types of trust suggest unique roles in the online purchasing process. For example, a person can have a high willingness to depend on others or situations in general (i.e., dispositional trust), but based on website specific visual cues on a website (e.g., the use of non-matching colours), the initial trust in a specific e-vendor might be low. Therefore, a low initial trust might still lead to a lower purchase intention. In contrast, an online consumer with low dispositional trust, but with positive beliefs in e-commerce, or the Internet in general (i.e., institutional trust), may still have high intentions to purchase online. Chen and Barnes (2007) identified initial trust as a factor to positively influence online purchase intentions of consumers. Their study confirmed that familiarity with online shopping (i.e., institutional trust) has a positive impact on purchase intention. Finally, Gefen (2000) showed that primarily dispositional trust affected an individual's trust in an online e-vendor. Bearing in mind the three trust types, the following hypothesis regarding the mediation effect of trust is stipulated:

**Hypothesis 3.** Trust influences the effect of predominantly (light and dark valued) blue coloured environments on behavioural intention.

## 2.3. Cultural differentiations

Consumers differ in their willingness to trust others and situations, which is related to their cultural background. These differences in uncertainty avoidance refer to how people within a certain culture manage ambiguous situations and events that are beyond their control. It also describes the extent to which cultures consider the future when making decisions in the present. For instance, cultures that tend to score high in uncertainty avoidance, place a high value on structure and security, and do not prefer to take risks. The opposite is true for people in cultures with low uncertainty avoidance (Hofstede, 2018).

Obviously, the degree of uncertainty avoidance will have an effect on online purchase intentions. For example, Lim et al. (2004) found that people from countries with a low tolerance for uncertainty will often perceive the risk of online shopping to be too high. They are therefore less likely to proceed with an online transaction than people from countries with low levels of uncertainty avoidance. In an online shopping environment, there is a higher chance that a consumer might perceive an unknown e-vendor as less trustworthy due to a lack of information about the e-vendor, the payment, or delivery process. In a traditional shopping environment this information is more easily accessible by, for example, directly talking to an employee. Therefore, it is argued that people in high uncertainty avoidance cultures, compared to low uncertainty avoidance cultures, need more convincing by the e-vendor in order to establish trust. Only then, high uncertainty avoidant consumers might decide to proceed with an online transaction with that e-vendor. Cultures scoring high on uncertainty avoidance might therefore react stronger to cues in an online environment that have been found to affect perceived trust, such as colour, leading to the following hypothesis:

**Hypothesis 4.** The effect of blue colours and trust on behavioural intention will be stronger for a high uncertainty avoidance culture than for a low uncertainty avoidance culture.

### 3. Methodology

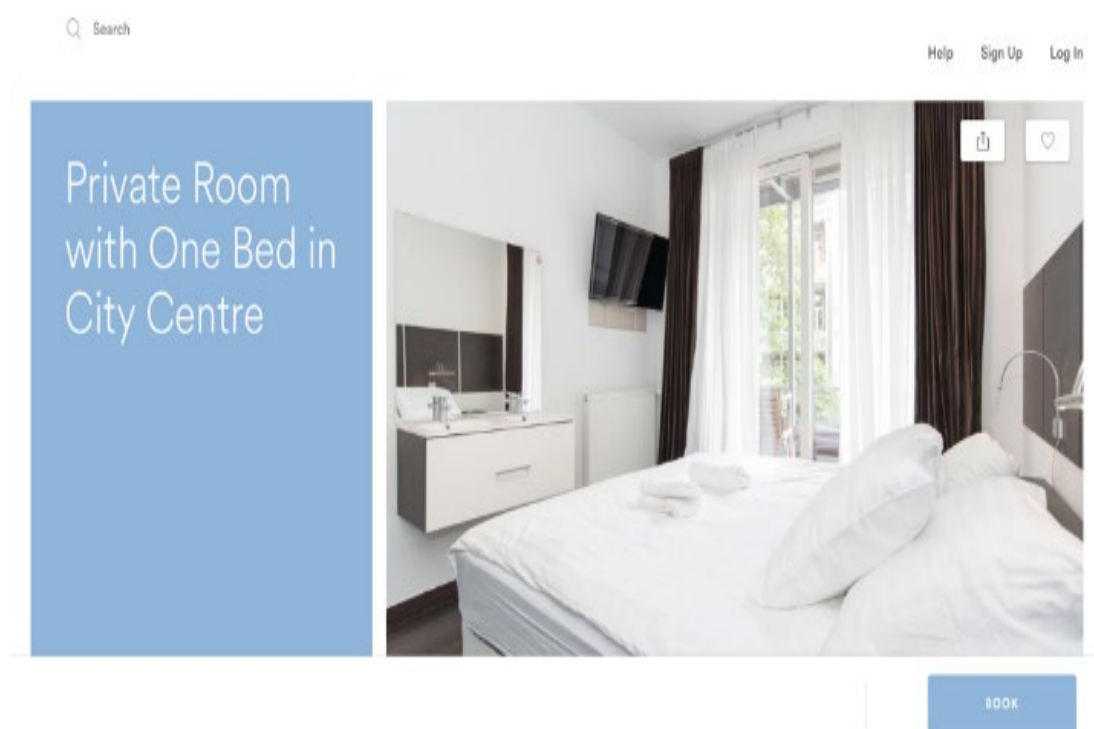
This study used a 2×2 design. The independent variable was colour (dark blue, light blue). The dependent variable was booking intention. Trust (initial, institutional, dispositional) was expected to mediate the relationship between colour and booking intention. Culture (Chinese, Dutch) was assumed to moderate the relationship between colour and trust.

#### 3.1 Sample

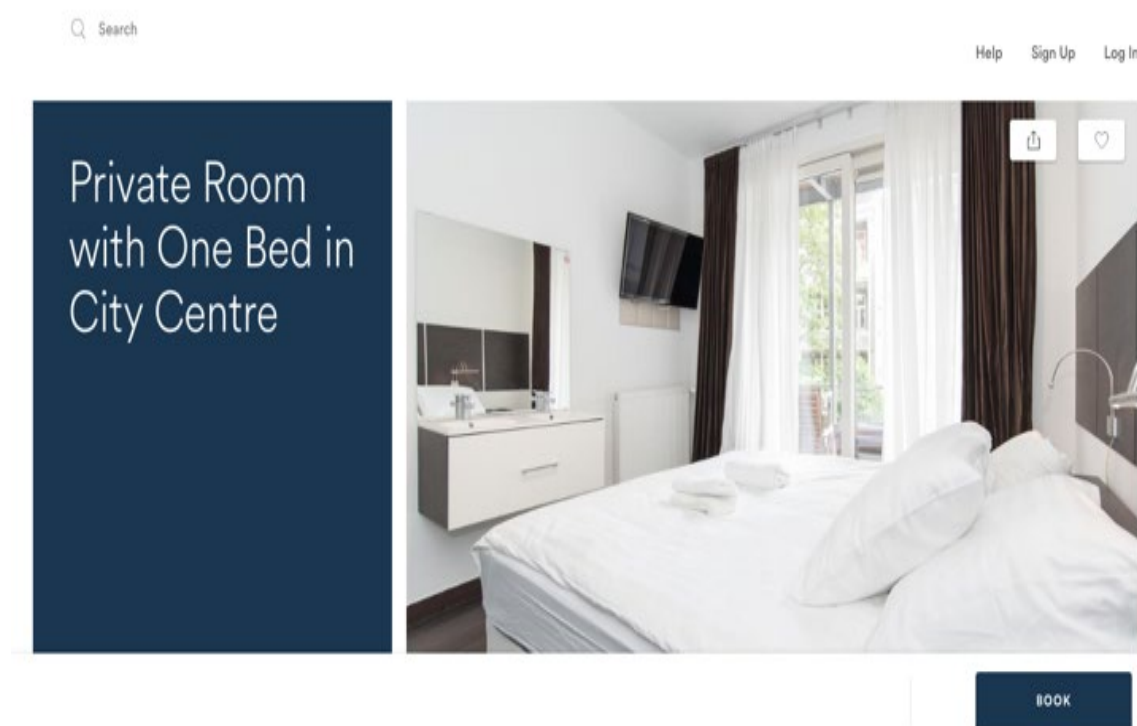
216 respondents completed an online survey: 132 females and 84 males. The mean age was 27 years (age range 18-65 years). There were 91 Chinese respondents, mostly living in China (29% male and 71% female), and 125 Dutch respondents from the Netherlands (46% male and 54% female). Their cultural background was checked through self-identification (*To what ethnic group do you belong?*). According to Hofstede (2018) China is a low uncertainty avoidance culture (score 30 on a 0-100 scale). The Netherlands is a higher uncertainty avoidance culture (score 53).

#### 3.2 Online environment

The respondents were presented with a (non-branded) accommodation offer (see Figure 1 and Figure 2). They were randomly assigned to one of the two conditions with a different predominantly coloured environment: light blue (RGB code = 8FB5DA) and dark blue (RGB code = 1A3650).



**Figure 1.** Accommodation offer with a light blue environment (RGB code = 8FB5DA)



**Figure 2.** Accommodation offer with a dark blue environment (RGB code = 1A3650)

The images were based on the original Airbnb way of displaying. Some elements were deleted for their potential confounding effect: i.e., the price per night, the rating, and the location (in both the search field and the description of the accommodation). All elements indicating an Airbnb environment were also deleted to avoid respondents being influenced by the reputation of Airbnb.

### 3.3 Questionnaire

The respondents were instructed to imagine a scenario in which “*you are going on a city trip by yourself, you want to book a room*”. Then they were shown the accommodation offer and were asked some questions. The Appendix gives all the items that were used in the scales of the questionnaire.

*Booking intention* was measured with one statement (*I would like to book this room*). Answers were given on a 5-point-scale (*strongly (dis)agree*):  $M = 3.95$ ,  $SD = 0.93$ .

The *trust scale* was adapted from Chen and Barnes (2007). There were nine statements, three for each type of trust: initial trust (e.g., *This website is trustworthy and honest*), institutional trust (e.g., *Prior online purchase experiences from other websites make me feel comfortable in using this website*) and, dispositional trust (e.g., *It is easy for me to trust a person*). Answers were given on a 5-point-scale (*strongly (dis)agree*):  $M = 3.46$ ,  $SD = 0.22$ . The trust scale had an acceptable reliability in this sample with Cronbach’s  $\alpha = 0.74$ .

*Uncertainty avoidance* was measured with seven items adapted from Jung and Kellaris (2004), based on Hofstede’s (2018) definition of uncertainty avoidance (e.g., *I prefer structured situations to unstructured situations*). Answers were given on a 5-point-scale (*strongly (dis)agree*):  $M = 3.35$ ,  $SD = 0.28$ . This scale had an acceptable reliability with Cronbach’s  $\alpha = 0.74$ .

*Online booking experience* was addressed with two statements (e.g., *I am familiar with booking accommodations online*), and a 5-point-scale (*strongly (dis)agree*):  $M = 4.05$ ,  $SD = 0.86$ .

*Manipulation check.* One question checked whether the respondents could remember the predominant colour used in the depicted online environment. Lastly, respondents were also presented with five coloured squares (light blue, dark blue, grey, light red, and dark red). They were then asked what colour they associated the most with trust.

## 4. Results

### 4.1 Manipulation check

Overall, in both conditions, blue was associated the most with trust. Whereas red was associated the least with trust (see Table 1). The percentage of respondents that associated trust with specific colours did not differ by condition,  $\chi^2(4, 216) = 2.25, p = .67$ . There were no significant differences between the Dutch, and Chinese respondents.

**Table 1.** Reported colour associations with trust per condition

<i>This colour I associate the most with trust</i>	Light blue condition (n=108)	Dark blue condition (n=108)
Light red	4 (4%)	4 (4%)
Dark red	8 (7%)	8 (7%)
Grey	22 (20%)	19 (18%)
Dark blue	27 (25%)	40 (37%)
Light blue	47 (44%)	37 (34%)

It was hypothesized that differences between the Chinese and Dutch respondents, could influence the intention to book the accommodation. An independent t-test, revealed that on average, the Chinese respondents ( $M = 3.52, SD = 0.50$ ) were more uncertainty avoidant than the Dutch ( $M = 3.19, SD = 0.65$ ). This difference, 0.33, was significant, ( $t(323) = -5.20, p < .001$ , BCa 95% CI [-0.46, 0.20]), and represented a medium effect of  $d = 0.57$ . On average the Chinese respondents reported less experience with booking accommodations online ( $M = 3.75, SD = 0.82$ ) than the Dutch ( $M = 4.26, SD = 0.65$ ). This difference, 0.50, was also significant, ( $t(214) = 5.02, p < .001$ , BCa 95% CI [0.31, 0.71]) and represented a medium effect of  $d = 0.69$ .

**Table 2.** Trust associations per condition (Means: min =1, max = 5 and, standard deviations)

	Light blue condition (n=108)	Dark blue condition (n=108)
Initial trust	3.50 (0.13)	3.56 (0.26)
Institutional trust	3.62 (0.11)	3.64 (0.10)
Dispositional trust	3.18 (0.26)	3.25 (0.20)
Total	3.43 (0.22)	3.48 (0.23)

For institutional and dispositional trust no significant differences were found between the respondents in the two conditions (see Table 2). So, in this respect the two groups are the same. However, we assumed for initial trust a difference between the groups in the two different conditions should emerge. This difference could only be found for one question. On average, respondents in the dark blue environment evaluated the website as more *trustworthy and honest* ( $M = 3.85, SD = 0.60$ ) than those in the light blue environment ( $M = 3.63, SD = 0.75$ ). This difference, -0.22, BCa 95% CI [-0.403, -0.042], was significant, ( $t(214) = -.86, p = .003$ ), and represented a medium effect of  $d = 0.33$ . Hence, only this initial trust question (henceforth: trust) was used in the further analysis.

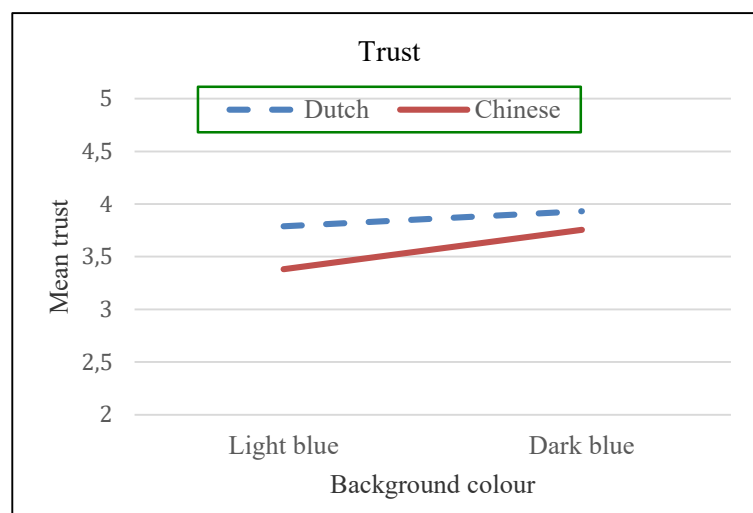
### 4.2 Colour

To examine whether light blue is preferred over dark blue in both cultures, a regression analysis was performed using the PROCESS procedures (model 1) developed by Hayes (2018). Culture was entered as independent variable, trust as dependent variable, and colour as moderator. The outcome of the regression model is presented in Table 3.

**Table 3.** Linear model of predictors of the change in trust (95% bias corrected and accelerated confidence intervals reported in brackets). Confidence intervals and standard errors based on 5000 bootstrap samples

	<i>b</i> [BCa 95% CI]	SE	<i>t</i>	<i>p</i>
Constant	4.28 [3.44, 5.13]	0.43	9.97	< .001
Colour (centred)	-0.09 [-0.63, 0.46]	0.28	-0.32	.755
Culture (centred)	-0.64 [-1.21, -0.07]	0.29	-2.21	.029
Culture x colour	0.23 [-0.13, 0.59]	0.18	1.27	.207

The overall model was significant,  $R^2 = 0.08$ ,  $F(3, 212) = 5.98$ ,  $p < .001$ . There was no significant main effect for colour. Culture had a main effect on trust. No interaction effect between culture and colour was found. The relationship between the two values of blue and the average trust for each culture is shown in Figure 3.

**Figure 3.** Relationship between light blue and dark blue, and mean trust per culture

#### 4.3 Booking intention

To examine whether culture interacts with colour in predicting booking intention, a second moderation analysis was conducted, with culture as the independent variable, booking intention as dependent variable, and colour as moderator. The outcome of the regression model is presented in Table 4.

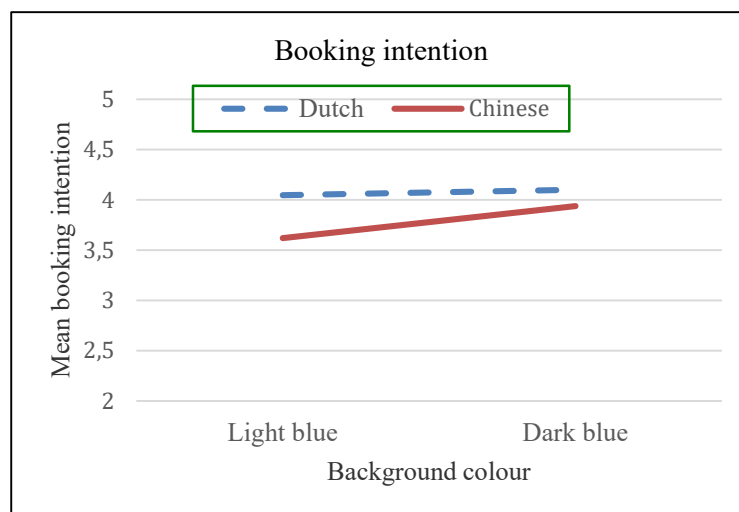
The overall model reached statistical significance,  $R^2 = 0.04$ ,  $F(3, 212) = 2.59$ ,  $p = .053$ . There was no main effect of colour on booking intention. The effect of culture was not significant. Additionally, the results showed no significant interaction effect, indicating that the relationship between culture and booking intention is not moderated by colour. The average booking intention per colour and per culture is plotted in Figure 4.

An ANOVA was conducted with colour and culture as the independent variables and booking intention as the dependent variable. The results showed a significant main effect of culture,  $F(1, 216) = 5.39$ ,  $p = .021$ . The Dutch respondents reported a higher booking intention ( $M = 4.07$ ,  $SD = 0.87$ ) than the Chinese respondents ( $M = 3.79$ ,  $SD = 0.10$ ). No significant main effect of colour was found,  $F(1, 216) = 2.194$ ,  $p < 0.40$ . The ANOVA also confirmed that there was no significant interaction between colour and culture ( $F(1, 216) = 1.08$ ,  $p = .30$ ).



**Table 4.** Linear model of predictors of the change in booking intention (95% bias corrected and accelerated confidence intervals reported in brackets). Confidence intervals and standard errors based on 5000 bootstrap samples

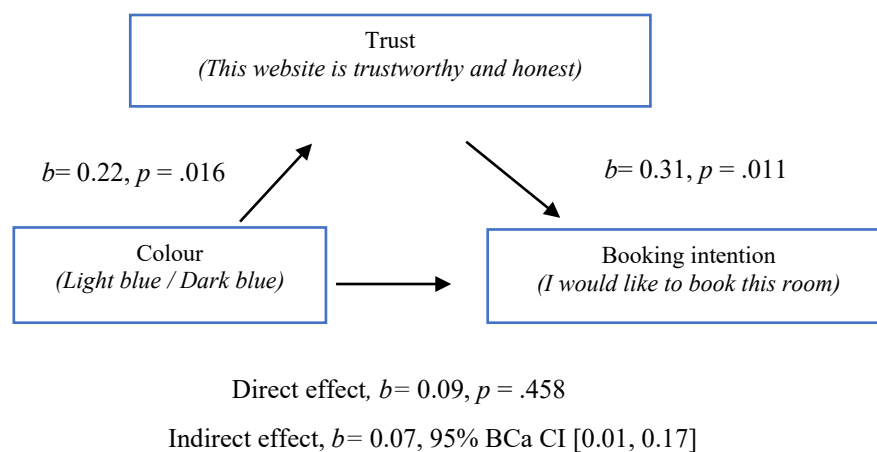
	<i>b</i> [BCa 95% CI]	SE	<i>t</i>	<i>p</i>
Constant	4.68 [3.50, 5.86]	0.60	7.81	< .001
Colour(centred)	-0.21 [-0.96, 0.55]	0.38	-0.55	.588
Culture (centred)	-0.69 [-1.49, 0.11]	0.41	-1.71	.089
Culture x colour	0.27 [-0.24, 0.77]	0.26	1.04	.301



**Figure 4.** Relationship between light and dark blue, and mean booking intention per culture.

#### 4.4 Trust

To examine whether booking intention can be explained by differences in colour and trust, a mediation analysis was performed using PROCESS procedures (model 4) developed by Hayes (2018). In this analysis, colour was entered as a predictor for booking intention, and trust was entered as mediator.



**Figure 5.** Model of colour as a predictor of booking intention, mediated by initial trust

Figure 5 shows that in the conceptual model the standardized regression coefficient between colour and trust was statistically significant, as was the standardized regression coefficient between trust and booking intention. Additionally, colour was found to positively contribute to trust, and trust was found to positively contribute to booking intention. The total standardized indirect effect was significant ( $b = 0.07$ , 95% BCa CI [0.01, 0.17]). The significance of this indirect effect was tested using bootstrapping procedures (5000 samples).

## 5. Conclusions

This study investigated the effects of colour, trust and, culture on the intention to book an accommodation. We found a positive association between the colour blue and trust. In both conditions blue was reported as the colour most associated with trust. This is in line with the findings of several earlier studies (e.g., Russo and Boor, 1993; Kim and Moon, 1998; Aslam, 2006; Cyr et al., 2010). In addition, in contrast with what we assumed (Hypothesis 1), dark valued blue in an online environment evoked a stronger sense of trust than light valued blue.

In this study a direct effect of colour on booking intention was not found. A predominantly light blue online environment did not result in a higher booking intention compared to a predominantly dark blue online environment (Hypothesis 2). And the conversely, a higher booking intention within a predominantly dark blue environment, was also not supported statistically. There was an indirect effect of colour on booking intention via initial trust. The findings confirm that initial trust plays a mediation role on the influence of colour on behavioral intention (Hypothesis 3). Further investigation is needed to understand as to why the indirect effect was present.

Finally, in this study there was no evidence for the moderating effect of culture on colour and trust, as predictors of booking intention (Hypothesis 4). In this respect, it is worth noting that, opposite to the scores of Hofstede (2018), Dutch respondents indicated to be more uncertainty avoidant compared to Chinese respondents. In Hofstede's (2018) cultural framework, a culture is built from a collective mental programme that influences the individual response towards an environment. With a globalizing (online) world, culture as a set of individual thoughts might blend, and disperse.

## 6. Limitations and further research

This study has limitations that provide some suggestions for further research. The perception of colour by the individual consumer is also influenced by physical elements (colour sighted and blindness), psychological elements (meanings and associations), and several elements of culture, such as norms (referents), values, religion and, gender (Aslam, 2006). In our study culture was only differentiated through self-identification (i.e. ethnic group) and uncertainty avoidance.

Importantly, this study showed that the premise made by Broeder and Scherp (2017) stating that blue engenders the most trust, can be partially supported. For this reason, the findings of this study provide enough support to further investigate the effects of the colour blue in an online environment. Based on this study, it is suggested for e-vendors to optimize their website with dark blue colour schemes for consumers from Western and Asian cultures.

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## Appendix

### *Scale for booking intention*

I would like to book this room.

### *Scale for trust*

#### *Initial trust*

This website is trustworthy and honest.

It is thought that this website keeps my best interests in mind.

Compared to other websites, this website is secure and reliable.

#### *Institutional trust*

Prior online purchase experiences from other websites make me feel comfortable in using this website.

Prior experiences make me believe in the future actions of this website.

Prior experiences facilitate my purchase decision-making processes.

#### *Dispositional trust*

It is easy for me to trust a person.

I tend to trust a person, even though I have little knowledge about him/her.

Trusting someone is not difficult.

### *Scale for uncertainty avoidance*

I prefer structured situations to unstructured situations.

I prefer specific instructions to broad guidelines.

I tend to get anxious easily when I don't know an outcome.

I feel stressful when I cannot predict consequences.

I would not take risks when an outcome cannot be predicted.

I believe that rules should not be broken for mere pragmatic reasons.

I don't like ambiguous situations.

### *Scale for booking experience*

I am familiar with booking accommodations online.

I have good experiences with booking accommodations online.

### *Manipulation check*

This colour I associate the most with...

What was the background colour of the images in this questionnaire?